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ABSTRACT

A 5-year longitudinal study was designed to examine diverse and promising programs to integrate career and technical education (CTE) with whole-school reforms in schools serving predominantly disadvantaged students. A literature review focused on conceptual underpinnings: disadvantaged youth; transition points; whole-school reform; and CTE. Longitudinal descriptions were provided of CTE-enhanced whole-school reforms with strong track records of improving educational chances of concentrated groups of highly disadvantaged students: Perkins III, High Schools That Work, career academies, career pathways, and urban learning centers. Second-year findings were based on qualitative data gathered to date. Progress of 3 cohorts of students--seventh, ninth, and eleventh grade--was followed as they proceeded through 10 schools at 3 sites. Findings indicated all three high schools had integrated CTE and academic education; faculty at high schools participated in many professional development activities; all high schools used computers--for student assessment and reporting requirements, teaching students about computers, instruction, and remediation; all middle schools were involved in some reform effort; strong leadership was a crucial factor in effecting change across all high schools; and administrators and faculty

attempted to allow students to have their first choice of unit/program. (Contains 67 references.) (YLB)

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# Helping Disadvantaged Youth Succeed in School:

## Second-Year Findings from a Longitudinal Study of CTE-Based Whole-School Reforms

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# Helping Disadvantaged Youth Succeed in School: Second-Year Findings from a Longitudinal Study of CTE-Based Whole-School Reforms

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## Executive Summary

This report provides second-year findings from a 5-year longitudinal study. The study examines diverse and promising programs for integrating career and technical education (CTE, previously called vocational education) with whole-school reforms in schools that serve predominantly disadvantaged students. We define disadvantaged students as those living in poverty (indexed by participation in the federal free and reduced-price lunch program), and those who are members of groups that have been historically discriminated against in U.S. society (African Americans, Hispanics, and immigrants groups for whom English is not their native language). This interim report begins the process of providing longitudinal descriptions of CTE-enhanced whole-school reforms that appear to have strong track records of improving the educational chances of concentrated groups of highly disadvantaged students.

The larger study of which this report is a part asks several questions, two of which are addressed in this report:

1. How have comprehensive school reform models affected CTE and overall education in middle schools and high schools—especially those that serve large disadvantaged populations?

2. How do students choose the career and technical concentration they will pursue for their high school years? Are issues of equity (e.g., encouraging nontraditional career choices, preventing CTE from becoming a dumping ground for low-achieving at-risk students) considered in the structuring of this choice?

### Methods

This report is based largely on findings from qualitative data gathered to date, although the larger study incorporates both qualitative and quantitative methods. The longitudinal component of the study involves following the progress of three cohorts of students as they proceed through 10 schools at three sites over a 4-year period. The choice of the 7th-, 9th-, and 11th-grade cohorts allows for examination of the effects of the individual schools on student progress, as well as an examination of the effects and effectiveness of various transitions among schools and community colleges in these "feeder patterns." Quantitative data on inputs, processes, and outcomes are being combined with qualitative, longitudinal case studies of each site.

Further methodological details, although not a part of this preliminary report, provide a fuller picture of the larger study. Findings from the longitudinal sites will be compared to analogous data collected at three demographically and geographically matched control sites to provide evidence that the effects observed at the longitudinal sites are likely the result of the reform efforts, and not simply due to characteristics of these or similar student populations. Findings from the longitudinal sites will also be compared to data gathered at three replication sites that are demographically similar to the longitudinal sites and involved in similar reforms. Replication site data will allow us to parcel out which factors at the longitudinal sites are unique to those contexts, and which are more probably applicable to a wider range of contexts.

**Sample**

The three sets of sites in the study's longitudinal sample each include a middle school, a high school, and a community college. One site also includes a regional vocational center, bringing to 10 the total number of schools in the longitudinal component of the study. Despite differences in geographic location and urbanicity, the three sites share similar demographics and concerns. Each high school serves a racial or ethnic minority population of over 50%. The sites have varying percentages of students who speak English as their second language. At each high school at least half of the students live in poverty, as indexed by participation in free or reduced-price lunch programs.

Three broad types of CTE-based whole-school reform are being studied. One of the longitudinally studied high schools is organized into five career pathways. Students choose a pathway around which to organize their elective classes and their senior projects. The second high school is a vocational-technical high school with over a dozen programs that they call shops. Students spend half of their time in their chosen vocational concentration, and the other half in academic courses. The third high school is divided into three career academies that include academy-specific English and social studies classes. Math, science, and elective courses are open to students from any academy.

**Preliminary Findings**

Our findings address several sub-questions of the two main research questions presented above. Much longitudinal data remains to be collected, so all conclusions are tentative and subject to further examination.

Whole-school reforms and curriculum integration. While levels of integration vary among schools and among teachers within schools, all three of the high schools in this study have integrated CTE and academic education. Our current hypothesis is that integration is easier to implement in high schools that have reorganized into academies or some other structure that is defined by interdisciplinary teacher teams (e.g., a 9th-grade "house") than the other types of CTE-based whole-school reforms we studied. Teachers in these structures are expected to jointly develop curriculum and jointly serve students. In contrast, at the schools where teacher teams are not an integral part of the reform, curriculum integration is more piecemeal and dependent on individual teacher initiative.

Professional development. Faculty members at all three high schools being examined longitudinally participate in many professional development activities, including designing and leading workshops, as well as attending them. All three high schools have faculty teams or committees that monitor faculty members' professional development needs. Faculty choice of professional development activities was also present at these sites. Two of the high schools share professional development activities with their feeder middle schools, so that middle school teachers can help their students make connections between what they learn in middle school and what they will be required to do in high school. Teacher collaboration across disciplines is encouraged at all of our sites.

Computer technology. All of the high schools in the study use computers for various purposes across the school, including student assessment and reporting requirements, teaching students about computers and computer systems, instruction, and remediation. Two of the high schools use their own students to maintain and repair all high school hardware systems. Students of all levels and abilities have been observed using computers at these high schools. Teachers at these high schools have been trained in the use of computers to make their work more efficient and to teach students how computers are used in various workplaces. Computers are well-integrated into the lives of students and teachers at the high schools in our study.

Middle school reform. Career and technical education is not a driving force at the middle schools in the study. However, all of these middle schools are involved in some reform effort aimed at providing students with a strong academic foundation. This is a useful role, since much of the academic skill improvement required by the federal Carl D. Perkins Vocational and Technical Education Act of 1998 has its foundation in middle school. Two of the middle schools in the study have strong connections to their respective high schools, either through common professional development, or through co-location on a shared campus. The third middle school is less closely connected to its high school; however, the two administrations and the counseling offices are in regular contact and coordinate events for middle school students to learn about the programs offered at the high school.

The importance of leadership. Across all three high school sites, strong leadership has been a crucial factor in effecting change. Strong principals and other leaders did not and possibly cannot force change; but they have been critical in setting an agenda and the tone for change.

All three principals projected a dynamic vision of their schools' potentials as academic and career-preparation leaders. All of the principals were either able to secure the funding necessary to support their agendas, or they found people who could provide those skills. Extra funding proved to be a necessary component of most reforms, because professional development, student materials, or special activities at schools undergoing reform were consistently beyond what the basic school budget could provide in these high-poverty contexts.

Principals who have been effective leaders of school improvement efforts in demanding, high-poverty contexts are often lured away by new challenges, and, typically, higher pay, in other contexts. This has happened at two of the study's high schools in the past two years. The research team will be particularly attentive to exploring the extent to which the reforms have been institutionalized at these schools, and how well the reforms will survive and evolve after the changes in leadership.

Student identification of program. Student choice usually refers to the choice of which middle school or high school to attend. Here we refer to which unit *within* the high school students will choose: which pathway, shop, or academy. We are interested in how schools attend to issues of racial and gender equity and balanced enrollment across units. In each of the high schools in this study, the administrations and faculties attempt to allow students to have their first choice of unit, since these options are designed to be related to a student's life goals.

Achieving gender and racial equity appears to be easier for the high school that is organized by career pathways than it is for the high schools divided into shops or academies. Career pathways do not determine student scheduling to the same degree that shops and academies do. At the pathway high school, pathways are manifest in students' electives, and many courses can be considered part of one or more pathways. In contrast, at the other two high schools in the longitudinal sample, once students have chosen their shop or academy, much of their coursework is predetermined. This has an impact on efforts to achieve equity, because if a shop or academy attracts one gender over the other, educators must decide between having a relatively gender-based distribution of students, or assigning students to shops or academies that were not their first or second choice.

**Next Phase of the Study**

One of the major advantages of longitudinal studies is the ability to follow up on emerging themes. At this point in our study, several important themes have emerged that will be included in future data collection activities.

Sustainability of education reform is an ongoing question, especially in "high stakes" testing contexts. We will be examining transitions more closely over the next several years. First, there is transition in leadership, as administrators and teachers who have initiated the reforms of interest to this study leave. We will be able to observe and report on the continuity of reform efforts as schools use various strategies to induct new faculty members into the reforms. The second transition of interest to this study is student transitions to and through successive levels of education. We will report on the 7th- and 9th-grade cohorts' transition successes to and through high school. We hope to say more in future years about the efficacy of the diverse mechanisms developed by schools and community colleges to facilitate the transition of students from high school to postsecondary education. The majority of the initially 11th-grade cohort will graduate from high school in the spring of 2002. Following their progress will provide information on the effects that schools' CTE-related reforms are having on students' rates of success in moving from high school into college and the workplace.

Finally, we will report in future years about how these reforms function to narrow the academic achievement gap between disadvantaged and advantaged students. Final analysis of outcome data will necessarily be done in the final year, although interim analyses will be conducted. As the study progresses, we will be refining and reporting on emerging understandings of the relationships among whole-school reform, career and technical education, and desired long-term student achievement for disadvantaged students.

## TABLE OF CONTENTS

Conceptual Base and Related Literature ..... 1
Disadvantaged Youth ..... 1
Transition Points ..... 2
Whole-School Reform ..... 3
Career and Technical Education ..... 4

Study Questions ..... 5

Reform Frameworks ..... 7
Perkins III ..... 7
Tech Prep ..... 7
Curriculum Integration ..... 9
High Schools That Work ..... 9
Career Academies ..... 9
Career Pathways ..... 11
Urban Learning Centers ..... 12

Summary of Reform Efforts ..... 13

Methods ..... 15
Study Sample ..... 17
Control Sites ..... 21
Replication Sites ..... 22
Limitations of the Study ..... 23

Preliminary Findings ..... 25
Whole-School Reform and Curriculum Integration ..... 25
Professional Development ..... 27
Computer Technology ..... 28
Middle School Reform ..... 29
The Importance of School Leadership ..... 30
Student Identification of Program ..... 32

Provisional Cross-Case Conclusions ..... 35
Whole-School Reform and Curriculum Integration ..... 35
Professional Development ..... 35
Computer Technology ..... 35
Middle School Reform ..... 36
The Importance of School Leadership ..... 36
Student Identification of Program ..... 37

Next Phase of Study ..... 39

References ..... 41

## List of Tables

Table 1. Population Statistics for the Three Longitudinal Sites ..... 19

Table 2. School Sample: Descriptive Data ..... 20

Table 3. Matrix of Longitudinal and Replication (REP) High School Sites ..... 23

## CONCEPTUAL BASE AND RELATED LITERATURE

This report provides second-year findings from a 5-year longitudinal study. The study has been designed to examine diverse and promising programs for integrating career and technical education (CTE, previously called vocational education) with whole-school reform. The study is focused within feeder patterns of middle schools, high schools, and community colleges in communities that serve high percentages of families that are economically or socially disadvantaged. Students from these families are thus "at risk" of not completing high school. This interim report begins the process of providing longitudinal descriptions of CTE-enhanced whole-school reforms that appear to have strong track records of improving the educational chances of concentrated groups of highly disadvantaged students.

We discuss initial findings on issues such as professional development and the importance of school leadership. In addition, we examine themes that will be pursued throughout the remaining years of the study, including issues of how best to sustain reform after the initial flurry of activity, or after a change in leadership.

This study was conceived as a way to identify CTE-based reform practices that have been successful in educating disadvantaged students so that they become engaged in school, achieve academically, complete high school prepared for postsecondary education, and succeed in postsecondary education and/or work. Several research strands have been integrated into this study, and they provide the conceptual underpinnings for the work. These include research on disadvantaged youth and attempts to enhance their engagement and success in school; research on the importance of transition points in a secondary student's educational trajectory; studies of whole-school reforms and their roles in school change and student achievement; and the literature on a broader conceptualization of career and technical education, which provides an important tool for engaging students in high school.[1]

### Disadvantaged Youth

The first important background frame for this study relates to the research on the challenges faced by "disadvantaged" students who are at risk of dropping out of high school and thus need to see the concrete benefits of staying in school. Diverse groups define "disadvantaged" in somewhat different ways. As noted by Stringfield and Land (in press), various authors prefer the terms "disadvantaged," "at risk," "placed at risk," and "placed at promise" to describe such students. Without denying the existence of this debate, we use the terms interchangeably to describe students who, through no fault of their own or of their family, are at risk of not thriving in traditional education. In this study, we follow Natriello, Pallas, and McDill (1990) and Land and Legters (in press) in including persons who are economically disadvantaged (e.g., students eligible for free or reduced-price school meals), and students who are members of groups that have traditionally been regarded as having been discriminated against in U.S. society (e.g., African American, Hispanic, and immigrant groups for whom English is not their native

[1] For a more detailed review that integrates these research traditions, see Castellano, Stringfield, & Stone, 2001.

language).[2] Both sets of authors note the existence of "concentration effects," and classify all students attending schools with extremely high poverty rates as being disadvantaged. While approximately 11% of young people between the ages of 16 and 24 throughout the United States have not completed high school or its equivalent (Kaufman, Kwon, Klein, & Chapman, 2000), the probability of poor or minority students graduating from large, high-poverty, inner-city high schools is often less than 50% (Balfanz & Legters, 2001).

Of great interest to policy makers are strategies that engage adolescents in the learning enterprise. There is an emerging body of evidence that demonstrates the retention power of CTE in high schools. Plank (2001), in an analysis of NELS:88 data, found that, after controlling for prior achievement, grades, and student background characteristics, the risk of dropping out was lowest near the point at which a student completed three Carnegie units of CTE for every four Carnegie units of academic subjects (e.g., approximately 40% of the student's high school courses were CTE-related). While Plank did not find a corresponding increase in academic achievement among CTE concentrators, it is self-evident that academic achievement cannot occur when students are not in school. Recognizing that CTE can keep youth in schools is a necessary condition to improving academic achievement for disadvantaged young people.

**Transition Points**

The second conceptual base holds that there are certain important transition points in a secondary student's education trajectory. The transition from middle school to high school is pivotal. Many of the symptoms of unsatisfactory high school achievement have their origins in middle school, when many students begin to disengage from school. Middle school is a time when students develop their identities as learners. Studies show that if their experiences are fraught with failure, many students lose self-esteem, often leading to poor attendance, loss of effort, delinquency, and eventually to the student dropping out of school entirely (Carnegie Task Force on the Education of Young Adolescents, 1989; Finn, 1989). Interventions at the high-school level are often too late.

Career exploration should begin early, probably in middle school (Balfanz & MacIver, 2000; Dynarski & Gleason, in press; Finch & Mooney, 1997). First, career exploration is believed to be a means of engaging young students at risk of dropping out. Second, some middle-school educators note that career exploration activities such as service learning and contextual learning can enhance student personal development in areas such as self-esteem, motivation, and responsibility to learn (Finch & Mooney). Finally, beginning career exploration in middle school provides students with more focus and direction as they select courses and programs that will move them toward the post-high-school trajectories that they and their parents desire. The more

[2] We note that "special education" students, or students for whom an individualized education program (IEP) has been written, are typically overrepresented among at-risk populations. The definition of disadvantaged students used in this study neither actively includes nor excludes special education students. If a student attends one of the longitudinal study schools or the matching control schools, they are included in the sample. This is true whether or not the student has an IEP. However, this study was not designed to address issues specific to special education students.

career-aware students are, the better prepared they will be to select the kinds of community-based learning opportunities appropriate to their career and life goals.

Another crucial transition point for secondary students is from high school to adult life, with all its choices. Schools have mechanisms in place to facilitate the transition from high school to postsecondary education options. These mechanisms, such as Tech Prep (Bragg, 2001) or dual enrollment programs (Boswell, 2001), have the potential to get students on a "fast track" and to pursue a postsecondary degree while still in high school. Other mechanisms exist, such as apprenticeships and scholarships.

**Whole-School Reform**

Research on whole-school reform comprises the third conceptual base for this study. By whole- or comprehensive school reform, we refer to efforts to restructure the organization of a school and the priorities of instruction so that a particular, unified vision of an improved school pervades the school. Whole-school reform always requires additional professional development for a school's entire faculty, with a focus on high standards for all students and enhanced cross-disciplinary cooperation. Forty years of research in diverse educational areas (Newmann & Associates, 1996; Nunnery, 1998; Stringfield et al., 1997) have demonstrated that school reforms are much more likely to have long-term impacts on school culture and student achievement if the change effort involves a schoolwide focus, rather than a targeted focus. School personnel are more likely to see results if they engage in a coherent, unified reform than if they introduce isolated, piecemeal reform practices.

A second overarching finding from research on whole-school reform has been that locally developed reform efforts tended to begin with a flurry of committees and design work, but rarely moved to actual classroom implementation (Nunnery, 1998). For this reason, many schools have adopted externally developed reform designs. Schools are also spurred by increased federal funding for Comprehensive School Reform Demonstration (CSRD), a program that began in 1997 with the goal of raising student achievement "by helping public schools across the country to implement successful, comprehensive school reforms that are based on reliable research and effective practices, and that include an emphasis on basic academics and parental involvement" (U.S. Department of Education, 2001).

Various organizations have developed, marketed, and delivered comprehensive school reform designs to schools across the country. In 2002, the federal government provided $260 million in CSRD funding to support K-12 schools interested in adopting these externally developed reform designs, and the U.S. Congress raised this support to $310 million for 2003. Schools can also use CSRD funds to develop their own approach to revamping their curriculum, instruction, and management around some unifying theme. The goal is for school personnel to "look at the big picture" and decide on a path of coherent reform toward improvement of student outcomes. Most schools adopt externally developed reform designs, although these designs will necessarily look different in each school, due to schools' different contexts, histories, and desire or capacity for change. School personnel are said to "co-construct," or adapt reform designs to their context (Datnow, Hubbard, & Mehan, 2002).

**Career and Technical Education**

The fourth background frame for this study supports a broader conceptualization of career and technical education (CTE) as an important tool for engaging secondary students. Hopkins (1999) advocated for an expansive view of CTE in which students are exposed to the contemporary workplace along three non-exclusive vectors: education *through* work, education *about* work, and education *for* work. Education through work refers to strategies in which students learn school subjects within a work context, or work-based learning. Education about work describes a curriculum that assumes that knowledge about the world of work is valid school knowledge. All students need to learn about democratic rights in the workplace, career ladders, and labor markets. Finally, education for work refers to job-specific training, which is probably best concentrated in the postsecondary phase of students' lives. Education for work must be premised upon actual workplace needs, but the curriculum must also meet the broader educative needs of workers, including general education components and education for participation in a democratic society.

Education through and about work can be infused into academic as well as vocational classes in high school. Teachers can work across disciplines to integrate their curricula, so that students see real-world uses for curriculum content, such as mathematical equations. Students can participate in internships that use what they have learned in school. Student engagement often increases when they do hands-on, real-world learning, as opposed to learning from traditional textbook and lecture methods (Dewey, 1916; Lave, 1988; Resnick, 1987; SCANS, 1991). Students see the relevance of what they are learning to contexts outside of school, where many students are oriented and find motivation.

In summary, students who drop out of school begin the process of disengagement in middle school or earlier, usually experiencing school failure in the form of low grades and test scores. They move on to high school, where their frustrations continue until they are old enough to legally leave the system. Without specific, targeted interventions, such students will be ill-prepared to earn a living that can sustain themselves and their families. Previous studies have suggested that at both the middle-school and high-school levels, implementing certain reform practices that are usually found in whole-school reform designs can lead to increased student learning overall, and to more equitably distributed learning among social classes of students (Balfanz & Jordan, in press; Balfanz & MacIver, 2000; Lee & Smith, 2001). Identifying CTE-based school reform efforts and practices that successfully guide students through high school and into productive adult lives is the goal of our study.

## STUDY QUESTIONS

The following questions form the basis for the larger study. In this second-year report, we address the first two questions. The latter four necessarily await the gathering of third- through fifth-year data.

1. **How have comprehensive school reform models affected CTE and overall education in middle schools and high schools—especially those that serve large at-risk populations?**

   Initial responses to this first question and its many corollaries comprise the bulk of the findings of this report. The report addresses the following sub-questions about how the combination of reform efforts is influencing instruction and outcomes at our longitudinal sites:

   - Has the combination of reforms resulted in greater integration of academic and CTE curriculum? Do teachers collaborate on curriculum development?
   - Do professional development opportunities reflect the goal of using CTE to engage students in their academic coursework? Do these opportunities allow teachers to work together across disciplines and grades?
   - How is computer technology used at these schools?
   - Have the middle schools in this study been affected by the reform efforts at their respective high schools? Have they adopted reforms of their own that are compatible with their respective high schools' efforts?
   - What is the role of school leadership in this type of reform combination? What are some important components of leadership? What happens when a change of leadership occurs?

2. **How do students choose the pathway, shop, or academy concentration they will pursue for their high school years? Are issues of equity (e.g., encouraging nontraditional career choices, preventing CTE from becoming a dumping ground for low-achieving at-risk students) considered in the structuring of this choice?**

Below are the remaining research questions that will be answered in future reports as the Year-3 through Year-5 data become available.

3. Has student attainment of proficiencies, credentials, or degrees increased?
4. Have student participation and completion rates for CTE programs, postsecondary education, and employment increased?
5. Have the changes to high schools brought about by comprehensive school reforms in turn influenced community college CTE and postsecondary education overall?

6. How have community colleges adapted their CTE programs in response to changes in the middle schools and high schools where comprehensive school reforms are implemented?

## REFORM FRAMEWORKS

From the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983) to the present, school reform has been at the forefront of educational research, policy, and practice (Castellano, Stringfield, & Stone, 2001). Educators from each of the schools in our study have drawn from different reform initiatives in their attempt to improve educational outcomes for all of their students. These reforms are derived in part from federal legislation, notably Perkins III and the Comprehensive School Reform Demonstration (CSRD) initiative. Other reforms are derived from diverse, independently developed reform efforts, such as High Schools that Work, career academies, and career pathways.

### Perkins III

All three of the high schools in this report are receiving federal funding authorized by the Carl D. Perkins Vocational and Technical Education Act of 1998, or Perkins III. This act funds vocational education in secondary and postsecondary schools. Unlike previous authorizations, Perkins III encourages secondary schools receiving Perkins funding to align their CTE programs with state and local reform efforts so that CTE becomes an integral part of those efforts. In addition, Perkins III supports:

1. Providing strong connections between secondary and postsecondary education ("Tech Prep")
2. Integrating academic and vocational curricula
3. Promoting student attainment of challenging academic and vocational standards
4. Providing students with strong experience in, and understanding of, all aspects of an industry
5. Involving parents and employers
6. Providing professional development for teachers, counselors, and administrators
7. Developing, improving, and expanding the use of technology (Bailey & Kienzl, 1999).

Tech Prep. Articulation agreements under Tech Prep are intended to provide coherent pathways linking specific high school skill acquisition and credits with community college occupational programs. CTE students take a sequence of two years of secondary and two years of postsecondary courses, thus eliminating coursework repetition and often finishing their associate degrees earlier than non-Tech Prep students.

By the mid-1990s, Tech Prep systems had been implemented in over one half of the comprehensive high schools (i.e., not including vocational high schools) and the majority of community colleges in the United States (Bragg, Puckett, Reger, Thomas, & Ortman, 1997; Levesque et al., 2000). There have been several studies of this implementation process (Bragg et al., 1997; Bragg & Layton, 1995); however, none of those early studies include student outcomes.

Bragg (2000, 2001) began a longitudinal study in 1998 of eight Tech Prep consortia that were considered "mature implementers." Due to large differences in implementation across sites, Bragg did not aggregate results over the eight consortia, but rather described the ranges of outcomes. Bragg (2001) found that minority student participation in Tech Prep ranged from under 10% to about 85% of students in these consortia, reflecting the overall school populations in these communities. Among students from low-income families (i.e., family income less than $30,000 per year), Tech Prep participation ranged from about 17% to 59%. In three of these consortia, these numbers reflected a slightly higher tendency for students from low-income families to be in a Tech Prep program than their counterparts from higher-income families. There is evidence that math course-taking increased across the sites, but the patterns are inconsistent. Among all Tech Prep participants across all consortia, between about 17% and 75% went on to 2-year colleges, and between about 5% and 53% went on to 4-year colleges. Future reports from this study are scheduled to disaggregate these postsecondary transition outcomes by demographic characteristics, and should shed more light on Tech Prep outcomes for at-risk youth.

A second evaluation found that Tech Prep was not having the impact it was designed to have (Hershey, Silverberg, Owens, & Hulsey, 1998). One reason for these results was that parents and students often balked at strictly defined sequences of courses explicitly preparing students for a postsecondary education at the local community college. Only 10% of consortia were found to follow such a rigid course sequence, because it appeared to dismiss the possibility of attending a 4-year college. Thus, Hershey et al. found that over one half of the Tech Prep initiatives consisted of applied academics courses targeted at vocational students, without explicit mention of the link to community college. The authors called this form of Tech Prep "enhanced vocational programs" (p. 83). Similarly, the remaining Tech Prep initiatives in the evaluation were not comprehensive programs with specific career emphases. Rather, they emphasized articulation, or career guidance, or applied academics, but not all Tech Prep components at the same time.

Instead of taking advantage of articulated courses and continuing with more advanced coursework at the community college, students were found to be retaking the articulated course at the college level (Bragg, 2000). Hershey et al. (1998) estimated that only about 15% of Tech Prep students ever received articulated credit, postulating that it was because so few Tech Prep students attended community college at all, and that of those who did, many were required to take additional tests or undergo delays before being granted articulated credit. Bragg found that the consortia in that study were beginning to offer dual credits[3], rather than granting college credit after college enrollment (and sometimes after completion of a semester). The conclusion stated that this was a way of calling attention to the value of the articulation process.

[3] While these terms can be defined differently, in this study, "dual credit" refers to credit granted to high school students at both the high school and community college levels for a course taken while in high school. The course can be taken at the high school or community college. This is often how Tech Prep credits are awarded. "Dual enrollment," on the other hand, is when a high school student enrolls simultaneously in the community college and attends classes there. More often than not, dual enrollment is for academic rather than career and technical courses.

Curriculum integration. The Perkins legislation called for the integration of vocational and academic education, defining curriculum integration as a set of courses comprising coherent sequences in which students can achieve both academic and vocational competencies. It has been difficult to assess the results of curriculum integration, partly because of the lack of consistency in the definition (Bell, Charner, & White, 2001). Given the relatively low status that vocational education often has in high schools, and the fact that vocational and academic faculty members often interact little, much less collaborate (Little, 1993), promoting reform based on curriculum integration has proven to be a slow process. A 1997 survey of comprehensive high schools reported that although the faculty members of 90% of the high schools surveyed had attended professional development sessions on curriculum integration, only 45% had implemented such curricula (Levesque et al., 2000). Since curriculum integration is rarely implemented in the absence of other reform elements, it has proven difficult to attribute student outcomes to curriculum integration in any simple way.

**High Schools That Work**

High Schools That Work (HSTW) began in 1987 as an initiative of the Southern Regional Education Board. It has since grown to include more than 1,100 schools in 26 states (Bottoms, 2001). The primary goal of HSTW is to "raise the academic achievement of career-bound high school students by combining the content of traditional college preparatory studies (e.g., English, mathematics, science) with vocational studies" (Herman et al., 1999, p. 76). This is accomplished through rigorous vocational courses, along with more required academic coursework. Common planning time is provided for teachers to collaborate on curriculum integration, and higher standards and expectations are set for all students (Bottoms & Presson, 1995; Bottoms & Mikos, 1995). Extra help is provided for students, as well as an individualized advising system. Finally, HSTW uses assessment information to improve student learning. All high school seniors who will complete a vocational or technical concentration at HSTW sites are required to participate in the HSTW assessment, which is based on the National Assessment of Educational Progress (NAEP) tests of reading, mathematics, and science.

Research has shown that "HSTW students, including vocational students, take more academic courses than students at the same schools did" before HSTW was implemented (Herman et al., 1999, p. 77). Schools that have implemented the design faithfully usually experience improved student achievement and higher attendance, graduation, retention, and postsecondary attendance rates (Northwest Regional Educational Laboratory [NWREL], 1999). Studies also show improvement on the HSTW assessment (Kaufman, Bradby, & Teitelbaum, 2000; NWREL). However, the NAEP results may be misrepresentative, since only those students who complete the HSTW-defined vocational concentrations take the tests, and non-completing students do not take the tests at all.

**Career Academies**

Career academies have existed since the 1970s, but their focus shifted in the late 1980s from a dropout prevention strategy to an approach that can prepare all students for both work and postsecondary education (Kemple & Snipes, 2000). In a longitudinal study on outcomes for

students in career academies, Kemple and Snipes reported a 15-fold increase in the number of career academies during the 1990s, with many more planned. Kemple and Snipes noted the ways in which career academies differ from traditional vocational education. Specifically, they found that career academies:

1. are organized as a school within a school, where students stay with a group of teachers over 3 or 4 years;

2. offer students both academic and vocational curriculum, usually integrated around a career theme; and

3. establish partnerships with businesses in order to build connections between school and work.

Kemple and colleagues (Kemple, Poglinco, & Snipes, 1999; Kemple & Snipes, 2000) began a longitudinal evaluation of career academies in 1993, with the goal of providing educators and policy makers with information on the effectiveness of career academies on student engagement in and completion of high school, and on student transitions after high school. Each of the career academies in the study received more student applications than they could serve, and students were chosen to attend via a lottery system. As such, a random-assignment study design was constructed that could more confidently attribute differences between the groups to the "treatment" of a career academy experience.

Kemple and Snipes (2000) found that among students at high risk of dropping out, those in career academies dropped out 10% less than non-academy students in the study. Their attendance rates were 6% higher, and 40% of the academy students earned enough credits to satisfy graduation requirements, compared to 26% of the high-risk non-academy students. Even among students at low risk of dropping out, career academies increased their likelihood of graduating on schedule, and increased their vocational course taking without reducing their completion of the academic core curriculum. This finding is consistent with Plank (2001), cited earlier. Career academies did not improve student standardized test scores; however, Kemple and Snipes questioned whether such scores are the best measures of the kinds of learning that take place in career academies. Kemple and Snipes found a great deal of variation in these findings across the nine academies in the study. As they disaggregated the elements of the career academies, they found that those career academies that provided strong interpersonal supports to students in the early years of high school appeared to be most successful in achieving the positive outcomes described above. Effective career academies were built around a core group of four or five teachers who taught almost exclusively within the academy. Students were scheduled together for several courses, to the exclusion of non-academy students, in classes that were housed in a distinct area of the school building. A team of teachers working over time with a group of students in well-defined learning communities constituted an effective strategy for achieving the kinds of outcomes described in the study.

Kemple and Snipes (2000) recommended that career academies should continue to serve a heterogeneous population of students, because it could be the mix of engaged and at-risk students that led to the benefits for the latter group. They also stressed the importance of the interpersonal and academic supports provided by career academies, claiming, contrary to Plank (2001), that simply offering a career focus and work-based learning without such supports would not be sufficient to engage at-risk students.

A recent study of career academies in one inner-city district in California with a large minority and low-income population found that academy students were generally more successful than the non-academy students when they transitioned to the nearby 4-year university (Maxwell, 1999). Academy students were found to have higher GPAs, to need less remediation in English at the university, and to graduate from the university more often than their non-academy peers. Despite these strong comparative findings, over 40% of the academy students still needed some remediation, and fewer than 60% of those who enrolled at the university graduated. Maxwell concluded that although academies contributed to educational success for a group of students originally not likely to attend college, this influence was not enough to overcome all the disadvantages faced by at-risk students from inner-city high schools. However, it is important to note that, in general, many students from higher-income families also need to take remedial courses in college (cf. Stasz, Kaganoff, & Eden, 1998), and also fail to graduate. It would be helpful to know the percentages of remedial course-taking and failure to graduate at the university level among higher-income populations in Maxwell's study before concluding that the findings are, in fact, not encouraging for at-risk students.

**Career Pathways**

A career pathway is a strategy to organize a high school curriculum around a cluster of occupations that require similar skills and knowledge, although they may differ in terms of length of education and training required. For example, a cluster such as Engineering, Manufacturing, and Industrial Technology can provide students with a broad introduction to many fields, such as machinist or engineer. This reorganization, sometimes called a career major, replaces traditional tracks such as the college preparatory, vocational, and general tracks. Many states, such as Louisiana, Washington, and Oregon, are mandating career majors or pathways for public secondary schools.

Career pathways form the context for curriculum reform and integrated activities such as senior projects and other interdisciplinary activities. Pathways, like many other reforms with roots in vocational education, are intended to have strong connections with business and industry and with postsecondary education, in order to give students internships or other applied experiences. Pathways are also intended to provide a rigorous, coherent program of study that includes high-level academics in addition to technology applications and work-based learning. In addition to the career pathways developed by states, the Office of Vocational and Adult Education at the U.S. Department of Education (2001) has identified 16 career clusters that high schools can choose from in developing their pathways, depending on local labor market opportunities.

No major studies have been completed regarding student outcomes in schools implementing career pathways. However, several states are requiring that high schools adopt career pathways or career majors, so more information should be forthcoming.

**Urban Learning Centers**

Like High Schools That Work, Urban Learning Centers is a reform design that schools may adopt using federal Comprehensive School Reform Demonstration (CSRD) funds to help defray the costs of implementation. Urban Learning Centers (ULC) is a K–12 reform design that creates articulated communities across all grade levels, usually housed in one building. The original ULC, then called Los Angeles Learning Centers, included three components (Johnson & McDonald, 1996) that became the model for future ULCs. These components include:

1. teaching and learning—integrating high standards into a thematic, interdisciplinary curriculum, experiential learning, and school-to-work transitions;

2. governance and management—all staff and school stakeholders are empowered to collaborate in the decision-making process; and

3. learning supports—health services, social services, and parent education on site.

Fully 98% of the first graduating class of the first two ULCs was accepted to postsecondary institutions—a tremendous increase over these schools' previous numbers (Aschbacher & Rector, 1995). This suggests that the design can have an effect on student outcomes in troubled urban areas; however, more rigorous studies remain to be conducted.

## SUMMARY OF REFORM EFFORTS

Much remains to be learned about how schools in general and secondary schools in particular engage in reforms, and if they can successfully integrate career and technical education into those reforms. How students fare in schools that combine comprehensive school reform with CTE reform is generally not well documented (Castellano, Stringfield, & Stone, 2001). Despite this lack of evidence, Congress continues expanding funds for CTE. The most recent budget appropriation for vocational education was $1.9 billion for fiscal year 2002-2003 (U.S. Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations Act, 2002). Schools continue to pursue reforms such as those described here to address the many issues confronting youth who are at risk of not completing their high school education. To better inform policy and practice, a set of overlapping studies of diverse efforts at middle- and high-school reform is required—each with a slightly different lens and set of methods. Such studies should include longitudinal, mixed methods (Tashakkori & Teddlie, 1998) that inform the field of the long-term effects on students of diverse CTE reforms. In fact, recent work suggests that students attending high schools that are implementing reform practices such as interdisciplinary teacher teams and smaller units within schools are having positive effects (Lee & Smith, 2001). Such studies based on national surveys need to be supplemented by closer investigations of a smaller number of schools that are implementing such reform practices. National surveys paint a broad picture, but only studies that include classroom observations and interviews with teachers and students can supply the necessary details of successful curriculum and instruction. When reform is happening and appears to be succeeding, funding should be directed toward close examination of what parts of the effort are succeeding, and why. Wherever possible, these studies should take advantage of naturally occurring experiments. This study, and the current preliminary report from it, begins to respond to this need.

## METHODS

This 5-year study is in the midst of examining diverse processes and outcomes through a combination of qualitative and quantitative methods (Tashakkori & Teddlie, 1998; in press). This second-year report is necessarily based largely on findings from the qualitative data gathered to date.

The longitudinal component of the study involves following the progress of three cohorts of students as they proceed through the 10 schools at our three longitudinal sites—three middle schools, three high schools, three community colleges, and one regional vocational center—over a 4-year period. The choice of the 7th-, 9th-, and 11th-grade cohorts allows for examination of the effects of the individual schools on students' progress, as well as an examination of the effects and effectiveness of three critical transitions among schools and community colleges in diverse feeder patterns.

Quantitative data on inputs, processes, and outcomes are being combined with qualitative, longitudinal case studies of each site. The input variables include a combination of district information on students' ethnic background, language status, poverty status (free and reduced-price lunch program participation), attendance rates, prior achievement, special education status (as defined by the local districts), migrant student status, and participation in CTE programs. Process variables include a combination of results of low-inference classroom observations and more descriptive multi-year observations of students, classrooms, schools, and districts. The latter process variable is described below with other case study information. The classroom observations measure such discrete categories as evidence of design implementation, presence of SCANS skills in the CTE classrooms/shops, and mean student engagement rates. In addition, the observation instrument has been designed to ascertain how and to what degree students are using math or writing in CTE classes, or working together in teams to create products with value beyond the classroom, lab, or shop. The observation instrument requires trained observer assessments of the presence or absence of CTE elements such as curriculum integration or SCANS skills. To gather these observational data, we are conducting classroom observations in the middle and high schools. Beginning in Year 3, we will also observe in selected community college classes.

The research team is examining two types of outcome data—measures of students' performance, and measures of career and technical education outcomes as identified in Perkins III. The former set of measures includes the following:

(a) student attendance and discipline data,

(b) student attitudes and awareness about career issues and opportunities, and

(c) measures of student achievement on state-mandated standardized tests.

The latter set of measures includes those identified by the states in which the sites are located. These include measures of:

(a) transition,

(b) credential acquisition,

(c) student participation in nontraditional education and training, and

(d) student achievement not included in the first category of measures, such as the awarding of high school and community college dual credit.

The research team is gathering baseline and yearly data on these measures.

We are also collecting qualitative data at each school to create detailed, multi-year case studies (Yin, 1994). These data include interviews and focus groups (Krueger, 1994) with students, teachers, and administrators. Among the topics of these interviews are participation in student vocational organizations and work-based learning opportunities, and teacher professional development opportunities. We are also conducting interviews and document reviews at the high schools' district offices, with community college administrators, and with the reform design team, where applicable, in order to ascertain the level of policy and program alignment, and inter-level communication.

In addition to interviews and classroom observations, members of the research team "shadow," or conduct whole-day observations, of 7th-, 9th-, and 11th-grade students at each site. These students were chosen on the basis of their demographics and achievement records. Specifically, we wanted to sample the range of students at each site, so we chose one 7th-grade student with limited-English proficiency at each longitudinal middle school, and we selected one 9th- and one 11th-grade student at each longitudinal high school to represent the site in terms of gender, racial or ethnic background, and choice of pathway, shop, or academy. We will continue to follow these nine students during our yearly site visits of two to three days. Previous studies (e.g., Stringfield et al., 1997) have found such shadowing activities to provide unique and useful information in understanding students' experiences and perceptions as they progress through schools undergoing reform. We are especially interested in observing whether and how students' plans for the future change over these 4 years, after being exposed to the CTE and comprehensive school reforms at their schools.

Qualitative analyses, including those presented in this report, rely upon the triangulation of data from multiple sources as outlined above. Following the case study methods of Yin (1994) and the grounded theory approach of Strauss and Corbin (1990), data analysis is proceeding based on the conceptual framework and questions that drive the study. These questions can be abbreviated as a search for CTE-based reform efforts that are effective in schools that serve at-risk students. With this question in mind, we coded interview transcripts according to the methods of Strauss and Corbin, who argue that coding is the central process by which theories are built from data. We began with *open coding* (Strauss & Corbin) of the data to date. This

process identifies concepts, which are then developed through the asking of questions about the data and the labeling and grouping of similar events and incidents into categories. Next, we engaged in *axial coding* (Strauss & Corbin) of these data, grouping the data into topical categories that emerged and were more specific (e.g., uses of computer technology, the role of professional development). Our next steps will include coding data from future site visits, and reducing the data within some codes (e.g., students' perceptions of whether they and their friends will graduate from high school) to a series of matrices (Miles & Huberman, 1994) to aid in within- and cross-site analyses.

During the coding process, we are making "operational notes," which include information regarding the description of codes and issues that emerge in the coding, as well as "theoretical notes," in which we record our observations of how the data fit with findings from previous studies. These methods are suggested by Strauss and Corbin (1990) in order to prevent the researchers' biases from blocking what is significant in the data and in order to keep an ongoing record of the analytic process.

Quantitative analyses will examine the relationships between the types of reforms implemented at the sites and the level of implementation, and the gains in academic achievement, attendance, program completion, and transition to secondary and postsecondary education. These results will be combined with the qualitative analyses to create case studies that illuminate the challenges of providing integrated CTE in a reform context, and that report on the outcomes of these efforts in three feeder patterns of schools. Data from the stepwise replication sites (described below) will be critically important in attempting to gauge the transferability of findings from the longitudinal sites.

**Study Sample**

The longitudinal and replication sites in the sample were identified and selected through a multi-stage sampling process. To identify plausible candidates for the CTE-based, whole-school reform feeder patterns, the authors pursued a "snowball sampling" strategy like that used by Weber (1971) and Lee, Ready, and Johnson (2001). The research team began by contacting authors of previous CTE studies. We contacted selected middle schools from a list of middle schools involved in school-to-work activities (Finch & Mooney, 1997). We wrote to the 50 State Directors of Vocational Education, soliciting site nominations. We contacted many of the sites nominated to us in these ways, usually initiating contact with the high school at the site. We inquired about each school's demographics and student participation in the free and reduced-price lunch program as an index for poverty status. We asked representatives from each site for information regarding the school reform design they were implementing, and for details on the career and technical education programs offered at the school. We sought high schools that were members of Tech Prep consortia and had articulation agreements with their local community colleges. If the state's department of education had school report cards or performance reviews online, we examined recent test scores. However, regardless of the state-level sophistication in data presentation, we sought triangulating support for the "exemplary" status of the feeder patterns. Schools that satisfied these criteria were then asked about their middle schools and community colleges to ascertain whether the entire set of schools would be appropriate for and

interested in participating in our study. We contacted the other two schools connected to the high school, and if all of the criteria and interest were present, the research team scheduled an exploratory site visit. Final site selection was based on a combination of strength of presenting evidence, geographic diversity, reform diversity, a high percentage of students fitting the above definition of disadvantaged, availability of longitudinal data, and the willingness of the administrations to participate in this longitudinal study

The schools that were eventually selected for inclusion in the sample are located in various parts of the country. They are involved in different comprehensive school reform designs and in many career and technical education reform efforts, and they serve a range of at-risk populations. We deliberately selected high schools that represented four common high school organizational structures that offer vocational education. Specifically, we have included a comprehensive, grade 9–12 high school, which is the most common high school structure, at about 15,000 nationwide (Lynch, 2000). Like many comprehensive high schools, the high school in this study collaborates with a regional vocational center, which has also agreed to participate in the study. Nationwide, there are approximately 1,100 regional vocational centers (Lynch). We have included a vocational high school, of which there are about 250 in the country (Lynch). Finally, this study includes a high school divided into academies. This is a fast-growing structure for U.S. high schools; there were about 1,500 high schools implementing academies in 2000 (Kemple & Snipes, 2000). Below, we describe the high schools that are included in this study as longitudinal sites.

Comprehensive High School[4] is located in an agricultural area in the Pacific Northwest, where primary local crops are potatoes and wheat. As such, many local jobs involve production agriculture, food processing, and agribusiness. There are also some industry and manufacturing interests that developed to support nearby federal facilities. Highly electricity-dependent metals manufacturing, such as aluminum and titanium, is also present. According to the area's industrial development council, manufacturing employment has increased an average of 6.6% per year for the past few years. Due to its location on a major river and at the intersection of major highways, the city is a transportation hub for the Pacific Northwest, with links to the world through air, rail, truck, and barge. Table 1 provides U.S. 2000 Census data on the city's population statistics by race and ethnicity.

Vocational High School is located in a small city in the Northeastern United States. This city has a history as a manufacturing center for textiles and metal, and is also a regional transportation hub. As with many industrial cities in the region, the 1980s brought recession and the offshore flight of industry and manufacturing. Today, the city is revitalizing, although manufacturing employment remains low. Most jobs in the city are in the service sector, in wholesale and retail trade, and in government. Table 1 provides general population statistics by race and ethnicity for this city, based on the U.S. 2000 Census.

[4] In keeping with the research team's agreement with the school districts and individual schools, all school names are pseudonyms, and all sites are disguised without altering the general characteristics of the schools or communities.

Academy High School is located in a large urban center in the West. A few of the many products of this large manufacturing center include aircraft, aircraft equipment, aluminum, games and toys, and women's apparel. The city is a hub for trade with Pacific Rim countries. Despite the large manufacturing base, the service sector, retail trade, and government sectors are the leading employers in the county. This city's population continues to grow, fueled in large part by immigration from Asia and Latin America (see Table 1).

Table 1
Population Statistics for the Three Longitudinal Sites

| City Being Served by | Total City Population | % African American | % Asian | % Hispanic | % Native American | % White | % Other/ Multiracial |
|---|---|---|---|---|---|---|---|
| Comprehensive High School | 25,000-50,000 | 3 | 2 | 56 | 1 | 37 | 4 |
| Vocational High School | 150,000-200,000 | 20 | 2 | 27 | <1 | 49 | <1 |
| Academy High School | >2 million | 11 | 10 | 46 | <1 | 30 | 3 |

*Note.* The percentages may add up to more than 100 due to rounding and/or because individuals occasionally choose to self-identify as belonging to more than one group. All data are derived from the U.S. 2000 Census (U.S. Census Bureau, 2001).

Each of the three high schools in our study is implementing elements of more than one reform. As such, each school is co-constructing (Datnow, Hubbard, & Mehan, 2002; Datnow & Stringfield, 2000) CTE and whole-school reforms in ways that the school personnel believe best fit their missions and contexts. Comprehensive High School has implemented career pathways across the curricula and participates in its local Tech Prep consortium. The middle school at this site collaborates with the community college on a federal GearUp grant to develop strategies and activities that help 7th- and 8th-grade students plan and prepare for postsecondary education. Vocational High School is a vocational technical high school, a member of the High Schools That Work network, and is expanding its Tech Prep offerings. The middle school at this site was part of the Accelerated Schools network, which advocates providing a rich curriculum to at-risk students. Academy High School is an Urban Learning Center divided into three academies. Selected students at Academy High School also participate in an academic enrichment program for neighborhood children sponsored by the local private university. This same enrichment program is present in the middle school, which is located in the same building. The entire building is on a year-round academic schedule.

All of the high schools in this study serve a majority of students from contexts traditionally regarded as placing the students at risk of educational failure. Table 2 provides demographic information on the three longitudinal high schools.[5] While all three high schools have student populations that are predominantly Hispanic, these populations are quite different. For example, in Comprehensive High School, students are predominantly Mexican. Many of these students are members of migrant families, and are away for almost one half of the school year. The Hispanic population in Vocational High School is primarily Puerto Rican. Although the city's population is just over one quarter Hispanic, this high school population is 53.4% Hispanic students—a disproportionate number in relation to the population as a whole. Such an imbalance is not the case at the high schools in the other two cities in the study, where the Hispanic population is near or over one half of the entire city's population. In Academy High School, the Hispanic population is varied, although chiefly Mexican and Central American. No students in Vocational High School and Academy High School are from migrating agricultural families, since they are located in urban areas.

Table 2
School Sample: Descriptive Data

| | Number of Students | % Free/ Reduced Price | % Hispanic | % Black | % White | % All Others | % Limited-English Proficient | % Special Education |
|---|---|---|---|---|---|---|---|---|
| Comprehensive High School | 2000-2500 | 50 | 54 | 4 | 38 | 4 | 10 | 11 |
| Vocational High School | 1200-1500 | 57[a] | 53 | 28 | 17 | 2 | 10 | 35 |
| Academy High School[b] | 600-800 | 94 | 71 | 28 | <1 | <1 | 27 | 3 |

*Note.* Unless otherwise noted, all data are from the 1999-2000 school year.
[a]2000–2001 data. [b]Data for Academy High School are reported for entire K–12 school. However, the demographics presented reflect those of the high school.

With respect to the special education populations at our longitudinal high schools, 11% of the students at Comprehensive High School are classified as special education students (as defined by the local district). This is approximately the same percentage as the overall percentage of students served in this state under the Individuals with Disabilities Education Act (IDEA) of the Improving America's Schools Act of 1994 (U.S. Department of Education, 2002). In contrast, Vocational High School's special education population (35%) is over twice the statewide percentage (about 17%) of students served under the IDEA Act (U.S. Department of Education).

[5] Note that all data presented are rounded approximations to further protect the anonymity of the sites.

The great majority of all secondary special education students in this district attend Vocational High School. Both the school and district personnel acknowledge that many middle school counselors encourage special education students of all classifications to attend Vocational High School.

The special education population at Academy High School comprises 3% of its total student enrollment. This is lower than the percentage of students in this state (about 11%) who are served under the IDEA Act (U.S. Department of Education, 2002). Officials in this district have attempted to place Special Day Class students into Academy High School with only partial success. The heavy college preparatory curricula and the presence of career academies leave no room for non-academic electives. The district and the school reported that this created hardships for special education students. As such, the district prefers that its special education students attend high school elsewhere.

The districts to which these schools belong represent the broad range of school district contexts in U.S. education. Comprehensive High School is the only high school in its small-town district, and both middle schools in town feed to Comprehensive High School. The region has a vocational center that provides specialized CTE instruction; it serves and is funded by 13 area districts. This vocational center is also participating in our study, where we are focusing only on Comprehensive High School students. Vocational High School is one of four high schools in a medium-sized city with one district. Students are offered open enrollment to their choice of high school. Three of the high schools are specifically college preparatory in nature, and Vocational High School is the district's vocational technical high school.

Academy High School is in a large urban district with over 60 high schools. As an Urban Learning Center, Academy High School is located on a single campus with an elementary school and a middle school. The small number of high school students listed in Table 2 masks the fact that it is a K–12 school of almost 3,400 students. Students at the middle school self-select to attend Academy High School, but because the middle school is over three times as large as the high school (2,500 vs. 700 students), there is an over-subscription of student applicants. Students are drawn from the pool in a stratified random manner. There are two exceptions to the random feature of the draw. The first includes a small number of students (about 30 per year, or about 4% of the incoming class) who have attended a local university-based enrichment program since the beginning of middle school. For reasons of continuity, this group is allowed to remain at the learning center through high school if they wish. Second, Academy High School has a very limited athletic program. For this and perhaps other reasons, self-selected male students are underrepresented at the high school, so there is an over-sampling of male students in the draw.

**Control Sites**

Working with the local school districts of the longitudinal schools or neighboring districts, we have identified and are following matched control schools' 7th-, 9th-, and 11th-grade cohorts of students at each site as they progress through the 4 years of the study. Process data will not be gathered at control schools. Rather, we are gathering the same quantitative data that we collect at the longitudinal sites. Although virtually all schools are perpetually involved in one or more

change efforts (Lee & Smith, 2001), our control schools are not involved in focused, whole-school reform efforts of the type and scope present at the longitudinal schools. In one case, students from the same neighborhood are chosen to attend either the longitudinal or the control high school through a process that is partially random (see above). This circumstance will allow the research team to observe a somewhat qualified naturally occurring experiment. In all cases, the control schools serve students who are demographically similar to those attending the longitudinal sites. The control groups provide evidence that the effects we observe at the longitudinal sites are likely to be results of the reform efforts, and not simply due to characteristics of these or similar student populations.

**Replication Sites**

Following Guba and Lincoln (1981) and Miles and Huberman (1994), we have built a "stepwise replication" component into the study's design. The purpose of such an effort is to provide an initial re-testing of findings from the longitudinal sites, and to do so in a maximally cost-efficient manner. During Years 3 and 4, we will visit three schools involved in similar reform efforts in other states. This variation will allow us to seek thematic similarities across sites while obtaining variation in governance and policy context. We have identified entire sets of replication sites (a middle school, a high school, a community college, and, in one case, a regional vocational center); however, we will focus the majority of our on-site data gathering on the high schools during the replication site visits.

The replication sites were chosen after extensive review of and deliberation regarding the "short list" of sites visited by the site selection team for possible inclusion as either longitudinal or replication sites. The research team sought to maximize data-gathering advantages that could accrue through the careful matching of similarities and differences among the finalist sites. We paired the longitudinal sites with the replication sites along several axes, such as school organization and reform design type, as depicted in Table 3. As can be seen, one longitudinal and one replication high school are organized along academies, a longitudinal and a matching replication site use comprehensive high school organizational models, and one of each are vocational high schools. Both academy high schools are wall-to-wall academies. Both comprehensive high schools work closely with their regional vocational centers, and both vocational high schools are members of nationwide reform networks. This is a structure that significantly strengthens the study. Further, the replication sites provide demographic balance to the longitudinal sites. For example, a wall-to-wall academy that serves a majority Hispanic and minority African American population is paired with a wall-to-wall academy replication site that is majority African American. Both schools' majority populations are high poverty.

Table 3
Matrix of Longitudinal and Replication (REP) High School Sites

| School Structure/ Reform Type | Academy Structure | Comprehensive High School | Vocational High School | Regional Vocational Center (RVC) |
|---|---|---|---|---|
| High Schools That Work | | $REP_{CHS}$ | VHS, $REP_{VHS}$ | $REP_{RVC}$ |
| Urban Learning Centers | AHS | | | |
| Talent Development HS | $REP_{AHS}$ | | | |
| State-Developed Reforms | | CHS | | CHS Regional Voc Center |

Legend
AHS—Academy High School
CHS—Comprehensive High School
VHS—Vocational High School

**Limitations of the Study**

All of science has limitations, and this study is no exception. We focus on four aspects of the study that can be viewed as either strengths or limitations, and are probably both. The four areas concern the focus on the modest number of school feeder patterns, the demographics of the schools, the fact that modern families often have—and exercise—choice in their children's schools, and the reform activities of the control schools.

First, our research questions focus on the activities of exemplary, or "outlier" feeder patterns of schools. It is necessarily the case that a school cannot be both exemplary and representative of the larger population. Therefore, the research team chose to examine some of these outliers and how their processes might be brought to a larger sample of schools by obtaining a detailed, longitudinal understanding of how the outliers came to be, how they are evolving, and how their CTE-enhanced whole-school reform efforts are being sustained.

Second, this study was designed to focus on what in CTE is often referred to as "special populations," that is, high poverty/high minority populations of students. Such a focus is in keeping with the current administration's goal of "narrowing the gap" in achievement between traditionally disadvantaged students and the middle-class majority of U.S. students. Thus, this study's sample is limited to public high schools serving over 50% minority and/or economically

disadvantaged students, as discussed earlier. Clearly, this is a minority of U.S. secondary schools; however, it is the group that must receive a substantially higher quality education if this nation is to close the achievement gap. A research focus on the neediest student populations becomes particularly important given studies that indicate a strong concentration of poverty effect (Balfanz & Legters, 2001) on student achievement and graduation rates. Such a sampling choice obviously limits the generalizability of findings from this study to highly affluent areas, while at the same time making the study's findings more immediately relevant to large urban centers and other areas where disadvantaged families tend to reside.

A third limitation of the study involves the increasing tendency in the U.S. of parents and students to exercise greater choice in their selection of public high schools. In the past, families more or less accepted their neighborhood's feeder pattern of schools as a fact of life. Today, affluent families are likely to purchase houses in areas where the schools have "good reputations" and high test scores. Hence, these families are exercising "choice." In addition, Local Education Authorities (LEAs) in high-poverty communities (e.g., urban systems) are tending toward a combination of "elite, citywide high schools" and open enrollment for all schools. In short, families are simply not choosing housing randomly and then sending their children to neighborhood schools.

Thus, having one feeder pattern in this study that feeds the only high school in the LEA (but with many other LEAs in the county) provides a type of external validity to that component of the study (i.e., it mirrors part of the larger population). Similarly, having a vocational high school from an urban LEA that offers a variety of high schools and open enrollment matches another model. Finally, having a "wall-to-wall academy" that is a school of choice within a large metropolitan area is another example of a "leading edge" strategy that is increasingly prevalent. The research team concluded that properly reflecting this wide range of choice strengthens the external validity of the study.

Finally, the research team anticipated and found that our control schools were engaged in various sorts of educational improvement efforts. The average U.S. public school is engaged in several school change efforts in any given year (Lee & Smith, 2001). However, secondary school outcomes, as measured by state tests, attendance rates, and graduation rates, tend to be unaffected by these various change efforts. As Nunnery (1998) has found, outcome-affecting change efforts are much more likely to be of the whole-school variety. Testing the fundamental hypothesis of this study does not rely on finding sites in which the longitudinal schools are involved in reforms and the control schools are doing nothing. In fact, the team doubts that we could identify any high school in the U.S. that did not perceive itself to be engaged in some type of educational improvement process (see for example, Hess, 1999). Rather, the hypothesis being tested is that the longitudinal feeder patterns are able to be more effective by innovatively using CTE as the driving force in whole-school reform, and the control schools are not.

## PRELIMINARY FINDINGS

We began this study with the working hypothesis that combining CTE reform efforts with comprehensive school reform designs in schools with high disadvantaged populations would result in positive outcomes in a variety of areas. Below we review our findings to date, which come primarily from interview data with students, teachers, and administrators. As this is an interim report, it is possible that these findings may be modified as additional data are gathered and analyzed. The questions addressed in this report are:

1. How have comprehensive school reform models affected CTE and overall education in middle school and high school, especially those that serve large at-risk populations?
    - Has the combination of reforms resulted in greater integration of academic and CTE curricula? Do teachers collaborate on curriculum development?
    - Do professional development opportunities reflect the goal of using CTE to engage students in their academic coursework? Do these opportunities allow teachers to work together across disciplines and grades?
    - How is computer technology used at these schools?
    - Have the middle schools in this study been affected by the reform efforts at their respective high schools? Have they adopted reforms of their own that are compatible with their respective high schools' efforts?
    - What is the role of school leadership in this type of reform combination? What are some important components of leadership? What happens when there is a change of leadership?
2. How do students choose the pathway, shop, or academy concentration they will pursue for their high school years? Are issues of equity (e.g., encouraging nontraditional career choices, preventing CTE from becoming a dumping ground for low-achieving at-risk students) considered in the structuring of this choice?

### Whole-School Reform and Curriculum Integration

All three of the longitudinal high schools in the study have instituted some level of curriculum integration. Comprehensive High School has implemented five career pathways. The principal at this school began curriculum integration in 1999. She found that many teachers in the traditional academic departments were reluctant to team with other disciplines, so she began with those teachers who wanted to collaborate. She arranged for them to have common planning time and a stipend for their extra work in curriculum development. Once the groundwork became refined within that team, the stipend circulated to other groups of teachers who had since become interested. In this way, curriculum integration is occurring gradually, but surely, and with the support of the participants. The principal believes that eventually all departments will see the benefits of and participate in curriculum integration.

For example, some 9th-grade teachers worked together in teams to develop interdisciplinary projects that integrated the computer literacy and health classes. The subject matter in the health class became the content for learning word processing and conducting Internet-based research in the computer literacy class. This allowed students to complete the health course requirements while learning to use the computer for two common school tasks.

At Vocational High School, curriculum integration is a significant focus in the ninth grade. All students choose a shop[6] by the end of the first 10 weeks of their freshman year at this 100% vocational high school. Approximately one third of incoming ninth graders read or do math far below grade level. The school leadership recognized that keeping these students out of the shop classes while the school provided remediation was not going to help these students succeed. As part of their reform effort, the teachers designed a "prep school" that integrates academic subjects with vocational applications. For example, in a math class, students might measure the area of their bedrooms to determine the amount of paint needed to paint it, or use manipulables to understand algebraic equations. In another example, the health occupations teacher partners with an English teacher to team-teach an English class in which Shakespeare's *Romeo and Juliet* is used to draw lessons on current public health topics such as premarital sex and gang violence.

Teachers reported that students were more engaged when the remedial math and English subjects were integrated into more practical, real-life lessons. One member of the research team, for example, noted that students engaged in thoughtful classroom discussion of the similarities and differences between their own experience of gang violence and that in the time of *Romeo and Juliet*.

Similarly, when the school's carpentry shop entered a regional competition to build a medieval trebuchet (a machine of war offering substantial technological advances over the catapult), one of the school's mathematics teachers was assigned to the advanced carpentry class for the semester. Through the continuous integration of practical trigonometry lessons and skilled carpentry, students became expert at the various calculations necessary to strike an exact target (in medieval times, a castle wall; in the 21st century, a six-foot-diameter "bulls-eye" on an athletic field of more than 100 yards) with a large, heavy water balloon slung from the trebuchet. When the actual competition date arrived, all other schools' teams were led by faculty members. In contrast, Vocational High School teachers merely drove the vehicle that transported the 8-foot-tall trebuchet to the competition site. All subsequent alignment, loading, firing, re-calculating, adjustments of settings, and repeated firings of the machine were fully under the direction and control of Vocational High School students. In the end, Vocational High School's all-student team won the competition over other schools' combined faculty-student teams by a substantial margin. In addition to having built what was by acclamation a better machine, the students exhibited a superior understanding of the practical trigonometry involved.

Academy High School is divided into three academies: finance, health careers, and technology. Each has a faculty team consisting of a history teacher, an English teacher, and the academy subject teachers. This structure allows the same academic topic to be taught with

[6] The vocational programs at Vocational High School are called shops, and we use their terminology in this report.

slightly different emphases across the academies. For instance, in the Finance Academy, the focus of a world history lesson on slavery was the economic doctrine of mercantilism, which led to a discussion of how such an emphasis on trade could lead to trade in human beings. In world literature, students read Machiavelli's *The Prince*. Similarly, in the other academies, history and English classes focused on health issues or on the various technologies of a given historical era or the era within a piece of literature.

**Professional Development**

The leadership team at Comprehensive High School developed a summer Career Pathways Institute for both middle school and high school faculty members. These institutes help teachers integrate academic and vocational subjects into career pathways. Both high school and middle school teachers have learned ways in which projects they assign can be completed and presented within a student's choice of pathways. Many teachers learned to use the pathways concept as a way to broaden students' thinking about their coursework. Now these teachers regard pathways as a way to expand students' thinking, not as a vehicle for tracking students. For example, in one middle school history class, students built models of medieval castles, accompanied by reports. The teacher encouraged students to emphasize some aspect of interest to them, be it the engineering aspect, or the economic system of those times. Another middle school teacher reported that when previous students came back to visit her, they told her that they had been able to connect things she had done in her middle school classroom with what they were now doing in their pathways at Comprehensive High School.

At Vocational High School, professional development opportunities are chosen by the Professional Development Team. That team includes teachers and administrators. It is charged with designing and often leading workshops for faculty members, as well as bringing in outside consultants. The team has created opportunities that help the vocational and academic faculty members work together more productively. This is a necessary strategy because they plan to create smaller learning communities that will require groups of teachers to work together as they work with cohorts of students.

Vocational High School has an added complication of being the only vocational high school in a district with numerous high schools, which has implications for its specific professional development needs. For example, a district-wide scope and sequence was recently mandated for academic courses. This required all academic teachers to participate in professional development within their discipline. This scope and sequence training was scheduled during teacher in-service time, making it difficult for Vocational High School to schedule joint activities across subjects and develop collaboration among vocational and academic teachers.

Academy High School has a site-based management team composed of teachers, administrators, parents, and students. Professional development options are nominated by the principal, who was previously the assistant principal for curriculum and instruction. These nominations must then be approved (or modified) by the management team. Teachers are also polled at various times of the year regarding their professional development needs. Depending on the need, staff from the Urban Learning Centers reform design team may provide professional

development. In this way, teachers learn the wide range of approaches that characterizes this reform design. For instance, in one recent workshop, teachers learned how to use rubrics to assess student work. Another set of workshops focused on using an electronic grading system that allowed teachers to interface with the district-wide system. This streamlined the busywork involved in student assessment and allowed teachers more time to develop curriculum or work with students.

**Computer Technology**

At Comprehensive High School, as discussed earlier, students are expected to learn how to conduct research online and to produce their work on computers in the ninth grade. Students at Comprehensive High School can also participate in a computer-based curriculum delivery program called NovaNet. Students register to take various academic courses delivered online. The method of instruction is pre-test, content delivery, and post-test. Students proceed through the requisite number of units to complete course requirements. Students may access NovaNet through any computer at the school or on their home computer over the Internet. If students have questions while working, they can ask the NovaNet staff in real time via an instant messaging system. Originally, NovaNet was used for remediation with a small number of students, but educators at Comprehensive High School are expanding its use as they recognize its value in reaching students with different learning styles.

While all students continue to expand their computer skills as they advance through the school, students in the Engineering, Manufacturing, and Industrial Technology pathway advance through specific courses in computer hardware architecture (including building and repairing personal computers) and software. Classes are offered in advanced uses of various aspects of software, such as the creation of 3-D animations, CD-ROM authoring, and website creation.

At Vocational High School, educators use a computer-based remediation system, Autoskills, which reportedly brings students up to grade level in reading skills within their freshman year of high school. While these students tend to then take four more years to finish high school, they are able to perform at grade level and graduate. Such an outcome is far superior to the all-too-common story of students who are below grade level and remain there until they drop out. Vocational High School has had success in bringing students up to grade level in reading and mathematics—in 1999-2000, 135 of the 160 incoming freshmen who tested below grade level were able to complete the 9th-grade curriculum by the end of their freshman year.

Vocational High School has recently discontinued its electronics service technician shop, which focused on VCR repair and other specialties, and instituted a computer networking shop with the opportunity for A+ certification for all graduates. Students in this shop learn how to build and maintain networked systems, applying that knowledge by maintaining the entire system at Vocational High School.

Academy High School has a technology academy that requires all students to achieve a wide range of theoretical and applied skills. Over a dozen students per year receive paid semester-long internships at a local software company. This partnership accommodates most students in this

academy during their time at Academy High School. The academy's students are responsible for the construction and maintenance of the entire school's computing and networking system. Students upgrade the system during their inter-session break. Their skills have become so widely recognized, several of the students are regularly employed on weekends to work on the networks of other schools and area businesses. These students are regularly paid $15-$19/hour, a pay rate that is virtually unheard of among legally-employed teenagers in their high-poverty, high-crime, heavily gang-infested part of the city.

The principal of Academy High School has had to insist that local firms not hire students full time, regardless of the level of skill or promise that a student possesses. Firms must also pledge not to hire the students after high school either, because these students have made a commitment to attend college, and the principal does not want this commitment compromised. That the firms would respect such a request is indicative of the respect that many in the community have for this principal and for his work in making Academy High School a successful high school where kids know they have a future.

**Middle School Reform**

The feeder middle school for Comprehensive High School is a partner in the local community college's federal GearUp grant. This grant works with middle schools to increase the number of traditionally underrepresented students in higher education. Middle school students participate in several activities that increase their awareness of the importance of attending college, such as creating portfolios in middle school and having a mentor. Students are assessed in the eigth grade with an instrument called Explore, which places students on a "world-of-work wheel" based on their strengths and interests. Another activity has entire classes of students and their parents visit local college campuses to explore post-high-school education opportunities in their areas of interest. Students record the results of these and other activities in their portfolios. The GearUp grant is in its third of 5 years, and summative results must await the middle school students' completion of high school and enrollment in (or rejection of) postsecondary education. Administrators of the program are satisfied with the level of participation to date, especially by parents, who have responded very positively.

As one of many career exploration activities, 8th-grade students at this middle school were trained in food handling by their local health department. They then took a performance-based exam to obtain a food handler's license, which is good for two years. This provides these students with an edge when they apply for jobs in a common adolescent workplace—fast food restaurants. Even those students too young to work can use the license to volunteer for church or youth group events—again preparing them for entry-level jobs, and providing experience that teaches good work habits.

Finally, faculty members at this middle school participate in Comprehensive High School's Career Pathways Institute, a summer professional development program that helps teachers integrate curricula and prepare middle school students for the pathways they will find in high school. Teachers learn where their curricula fit into the career pathways offered at the high school, and how they can apply pathways in their existing assignments and activities.

The middle school feeder for Vocational High School offers a technology/engineering course. One of the units in this class is a modular technology education curriculum (Brusic & LaPorte, 2000) designed to introduce students to broad career clusters related to major sectors of the U.S. economy (e.g., flight simulation, meteorology, communications). The middle school also offers a more traditional family and consumer science course to all eigth graders.

Academy High School is an Urban Learning Center where the elementary, middle, and high school components are located on one large campus. In part because the school had begun as a very large middle school, many of the original faculty members became part of the high school faculty. This common heritage, combined with sharing a campus and a single administration, has resulted in relatively rich formal and informal networks among faculties. While the middle school is not divided into academies, teachers work to connect middle school students with the logic and the expectations for success that permeate the high school. Observers noted that this is one of the most orderly and academically-focused non-magnet urban middle schools they had ever seen.

**The Importance of School Leadership**

School leadership refers to more than just the principal. Other administrators and teachers can and must share the lead in reform efforts (Murphy & Datnow, 2002). Such a delegation of power is a way of assuring that change is determined by and belongs to the entire staff. Reform is not something that comes from the top down at the schools in our study; rather, it belongs to all who choose to participate. We will discuss leadership in the areas of reform initiation, seeking funding support for the reforms, and overall vision.

Leadership of the reform effort at Comprehensive High School is best described as a multi-level effort. In the mid-1990s, the state where Comprehensive High School is located passed school reform legislation that set certain goals but left the process for achieving those goals to individual schools. Soon afterward, the state received a federal School-to-Work grant, and the department of education chose to concentrate the funding at a few sites throughout the state. These high schools would become pilot sites for the rest of the high schools in the state. The school's vocational director at the time applied for Comprehensive High School to become one of the pilot schools, implementing career pathways as a means of integrating School-to-Work with the new state standards. Comprehensive High School received the grant, and faculty committees formed to implement and integrate the two strands of reform. While the principal was quite enthusiastic about career pathways, she did not want to be seen as "driving" the reform. She consistently supported the creation and advancement of the various faculty committees, and allocated professional development funds, planning time, and space to the various curriculum integration teams and process committees.

With respect to funding support for career pathways and other initiatives at Comprehensive High School, the leadership has adopted a comprehensive approach, so that if any funding source should disappear, no initiative need expire. All of the school's basic education funding from the state is pooled with the ESL (English as a Second Language), Perkins, and other targeted funding sources to increase opportunities for all students. In this way, all categories of students are

mainstreamed at Comprehensive High School. Various teachers and administrators told us that their focus is on "what's best for the students." For example, rather than hire ESL teachers with their ESL money, they used the funds to purchase materials and to train the entire faculty on ESL/Sheltered English teaching strategies. If ESL funding should decrease, they will not lose faculty members who were hired to serve only one group of students at the school. In addition, ESL students are able to take any course offered because all of the teachers are knowledgeable about how to work with them.

The principal of Comprehensive High School is a hands-on, approachable delegator who understands that it is preferable for teachers to arrive at curricular and other changes by virtue of observing their colleagues implement and benefit from these changes. She believes in allowing teachers to choose whether or not to implement reforms. However, she acknowledges that change is inevitable, and sooner or later, all teachers at Comprehensive High School will adapt to career pathways, or they will likely move on to another school. At the end of the first year of the study, this principal retired and the former associate principal became the new principal at Comprehensive High School.

Vocational High School had been plagued by gang violence, fearful teachers, and apathetic counselors. The current principal was appointed to prevent the school from losing its accreditation. Her first step was to make the school safe so that learning could take place. She reached an agreement with the gang members not to operate on the Vocational High School campus, and she hired a safety officer to enforce the agreement. She also began to instill a sense of pride and respect in the students. At first, her attempts evoked derision from both students and staff, since they did not perceive themselves or Vocational High School in the same positive light as the principal portrayed them. But her goal was to change reality, and over time, students did begin to behave in the ways that faculty members modeled and encouraged.

As a result of her own research, the principal was committed to a Total Quality Management (TQM) process. She reached out to businesses that were also involved in TQM, and after 2 years of change efforts, she found the High Schools That Work network. She was attracted to it because it furthered her efforts at teamwork, problem solving, and improving systems through continuous feedback.

This principal is satisfied with the progress at Vocational High School, although she acknowledges that much remains to be accomplished. A gauge of her confidence in her teams is her comment that she could go away for a week and be secure in the knowledge that the school would continue to run smoothly without her.

With respect to funding, Vocational High School is aggressive in its pursuit of both state and private funding. Teachers and administrators write grants to private foundations for technology upgrades, library materials, and professional development consultants. They seek state funding to supplement their Perkins dollars in the area of professional development for curriculum integration. Further, they seek new partnerships with area businesses.

This principal continues to lead by example and delegation. She has introduced Advanced Placement courses to students whom no one else believed could handle such courses. Through her introduction of teams of teachers and administrators, most of the school's systems have improved—the physical plant, staff capacity for change, student behavior, and academic rigor.

In the mid-1980s, Academy High School had been a middle school with over 3,000 students. The principal became convinced that a major restructuring—not just of the specific middle school, but of the idea of the school and its relationship to the community—was overdue. When the district's administrative leadership and teachers' union leadership began seeking sites for a new "New American Schools" whole-school reform design initiative, they contacted the principal of the middle school and invited his participation. He quickly accepted, and began creating a K-12 "learning community" campus. The principal and the faculty members were literally co-constructing the Urban Learning Centers design with the reform design team.

Like the other principals in this study, this principal believed in giving ownership of change to faculty members. For example, students' poor classroom and hall discipline was an issue, so the principal invited teachers to create a behavior management program that would result in a safer and more orderly environment. The principal said he knew that the first plan the faculty devised would not work. "I could have told them it wouldn't work, but I wouldn't [sic; didn't], because that would be defeating everything that I believed in." Instead, the faculty members implemented the plan, and when it failed, they developed a new, better plan, which they have subsequently continued to revise. The teachers built tremendous ownership in "their plan," and the school now has very few student discipline problems. The principal views a wide range of problems as team-building and professional development opportunities in disguise.

Due to this principal's key role in developing the Urban Learning Centers reform design and the subsequent positive results that students showed, the principal has been able to secure funding for various projects. His Finance Academy students receive a shirt with a logo, and take a yearly trip to the city's financial center—all courtesy of various business partners. The district provides the school with buses to transport students to the nearby private university for enrichment, and faculty members also bring in funding for their own projects.

This principal has been visionary—believing that all students can achieve, graduate, and attend college, even those whom the rest of society has neglected. His brusque demeanor has not always made friends among faculty members or the district, but he is respected by all, and has strong union and parent support. This principal retired at the end of the prior school year (2000-2001). As with Comprehensive High School, an assistant principal from the school has taken the helm. She has told us that the mission and vision remain the same; only the management style will change.

**Student Identification of Program**

Student choice usually refers to the choice of which middle school or high school to attend. Here we refer to which unit within the high school students will choose—which pathway at Comprehensive High School, which shop at Vocational High School, and which academy at

Academy High School. In this report, we are interested in how schools attend to issues of racial and gender equity and balanced enrollment numbers across units. In each of our longitudinal high schools, the administrations and faculties attempt to allow students to have their first choice of unit, since these options are designed to relate to a student's life goals.

Comprehensive High School has identified and implemented five pathways: Arts, Communication, and Entertainment (ACE); Business and Marketing Management (BAMM); Environmental/Agricultural Resources Technology Horizons (EARTH); Engineering, Manufacturing, and Industrial Technology (EMIT), and Health and Services (HandS). Students must choose from among the pathways at the end of their 9th-grade year, after they complete two-week units on each pathway in their regular academic classes. For instance, the 9th-grade English classes do the unit on ACE, the 9th-grade math classes do the unit on EMIT. They are curricular units that incorporate career exploration, guest speakers, and other activities. The principal described the units as the "occupational expression" of each academic subject.

From tenth to twelfth grade, students' academic classes are not specific to career pathways. That is, students from several pathways may be enrolled in any math or English course. Teachers do attempt to incorporate pathways where possible, and encourage student assignments and projects that are based on each student's pathway. Through in-service professional development, teachers have learned how their curricula connect to the five pathways. In contrast, student electives are pathway-specific, such as drama or journalism in ACE, and 3-D digital animation, which could be applicable in several pathways. It is best to conceive of career pathways at Comprehensive High School as a way of providing focus to the otherwise "shopping mall" high school experience.

Within the pathways are CTE subjects such as computers, carpentry, and business. Whereas students tend to take CTE classes in areas typical for their gender (e.g., more male students in carpentry and computers), Comprehensive High School recently received a state grant to recruit nontraditional students into new areas. As a result of their efforts, eight female students enrolled in information technology, compared to none the previous year. The vocational director attributed this to the training that teachers and counselors received through the state grant, and to having hired a female computer engineering teacher.

Vocational High School is the only vocational high school in a district offering open enrollment among four high schools, three of which offer a college preparatory curriculum. Middle school students in the eigth grade are expected to choose the high school they want to attend. High schools promote their offerings by visiting each middle school and advertising their programs to eigth graders.

Vocational High School offers experience in over 13 shops, including culinary arts, carpentry, auto mechanics, auto body work, retail marketing, print shop, cosmetology, metal fabrication, nursing, machine shop, computers, horticulture, and drafting. Once at the school, students take both an academic and a vocational curriculum. In the first grading period (10-week quarters) of the ninth grade, students do "exploratories," cycling through all the shops to learn about each one. They spend one day in each shop, then go through the entire cycle once more for

a second day. After the second cycle, two weeks are left in the quarter. Students tentatively choose a shop at that point, and spend an entire week each in their first- and second-choice shops. They accumulate points for attendance, performance, and attitude. At the end of the exploratory period, students choose the shop in which they want to enroll. Some of the more popular shops (carpentry, culinary arts, auto mechanics, and auto body work) tend to be overenrolled, so students' accumulated points and teacher recommendations play a role in the eventual placement of all students into shops.

With respect to gender equity, some of the traditionally male shops such as computers or machine shop continue to have female student enrollments of about one quarter to one third of the total. Vocational High School has a bilingual nontraditional vocational counselor who encourages all students to participate in all of the shops during the exploratory period. Despite their efforts, gender equity has not yet been achieved in the shops at Vocational High School and remains a goal of administration and staff.

Academy High School has three academies: finance, technology, and health careers. The school orients students toward 4-year college enrollment, so, according to the principal, the school could have offered almost any academy: "I like the connectedness. I like the smallness. I love the teaming. I don't care about the theme.... The theme to me is not as important as the teaming and the smallness and the understanding." But the principal does realize that the academies provide students with skills and experiences that the standard high school experience does not. Students seem to realize this as well—if students know what career they want as an adult, and no academy at this high school exists for that career, they are still able to choose. For instance, a student who wants to be a lawyer can still choose and benefit from any academy at this school, because knowledge about business, technology, or health is useful regardless of ultimate career choice.

Students choose their academy at the end of ninth grade. The administration attempts to give students their first choice, while also being cognizant of demographic equalities. For example, administrators try to put a roughly equal number of male and female students in the Health Careers Academy, but such an overwhelming number of female students apply to that academy, administrators do not usually succeed at gender equity.

Students' electives for the remainder of their high school careers are determined by their academy choices. In addition, the English and history teachers "team and theme" within each of the academies to provide interdisciplinary, project-based learning and to connect the academic subjects with the academy. Math and science are not related to the academies—these classes may contain students from any academy, and math and science teachers do not necessarily try to link the subjects to academy topics.

## PROVISIONAL CROSS-CASE CONCLUSIONS

We consider the following conclusions to be tentative, and as hypotheses to be tested over the next 3 years. All of these tentative conclusions address the effect of combining CTE and whole-school reform on the disadvantaged populations at the middle schools and high schools in our study.

### Whole-School Reform and Curriculum Integration

All three high schools have reorganized and integrated their respective curricula to some extent. These efforts have greatly increased faculty interactions across traditional CTE/academic boundaries. Curriculum integration appears to have been easier to implement at Academy High School, because the academy structure is defined by teacher teams who are expected to collaborate. Curriculum integration is also expected when a separate "house" is created, such as the 9th-grade prep school at Vocational High School. In both structures, teachers have the organizational support they need to jointly develop curriculum; indeed, that is part of what is expected of them as members of separate units such as academies or houses. At the schools (or units of schools) where such a reorganization has not occurred, curriculum integration is more piecemeal and dependent on individual teacher initiative.

### Professional Development

At all three high schools in the study, professional development opportunities emphasize broad, CTE-based themes and practices, usually selected by the faculty members themselves. Two of the high schools in the study share professional development activities with their feeder middle schools, so that middle school teachers can help their students make connections between what they learn in middle school and what they will be required to do in high school. We found a constructive amount of teacher choice in professional development across sites, as well as a recognition among professional development teams or committees that curriculum integration and teacher collaboration across disciplines are important goals for reform. Finally, all three sites supported teachers' and administrators' participation in professional conferences, such as High Schools That Work or state Tech Prep conferences.

### Computer Technology

All of the high schools in this study own and use large numbers of computers for various purposes, including student assessment and reporting requirements, teaching students about computers and computer systems, instruction, and remediation. Two of the high schools have their students maintain and repair all high school hardware systems. Students of all levels and abilities have been observed using computers at these high schools.

At many schools, computers are purchased and then rarely used because teachers may not be technologically sophisticated, and they may lack the funds for training (Cuban, 2001). At other schools we have observed, students only use computers for fun (i.e., computer games), after they have finished their classroom assignments. In contrast, educators at most of the schools in this

study have applied for grants to acquire and support a high level of technology. In addition, teachers at these high schools have been trained in the use of computers to make their work more efficient and to teach students about how computers are used in various workplaces. In summary, computers are well integrated into the lives of students and teachers at the high schools in the study.

**Middle School Reform**

In two of the middle schools in this study, students can choose to attend a high school other than the one participating in this study. Therefore, these middle schools must prepare students very broadly, focusing on a strong academic foundation so that students can succeed in whatever high schools they attend. An administrator at one of the middle schools noted that middle school was a time to focus on the learning process rather than on specialized content. Students need to learn how to become independent learners so they can benefit from the more content-specific courses in high school and beyond. This mission supercedes any career focus, although general career exploration is a goal at two of these middle schools.

Two of the middle schools have strong connections to their respective high schools, either through common professional development, or through location in the same building. The third middle school is not as connected to its high school, Vocational High School, as the others are. This lack of strong connections to a middle school can present challenges for this high school, because students in this district have their choice of high schools. Given the historically low status that Vocational High School holds in a district with three college preparatory high schools, strong connections with the middle schools would seem to be an important component of attracting competent students. We learned through interviews at both the middle school and the high school that many academically talented students are dissuaded from attending Vocational High School.

**The Importance of School Leadership**

Across all three high school sites, strong leadership has been a crucial factor in effecting change. Strong principals and other leaders did not, and possibly cannot, force change; but they have been critical in setting an agenda and the tone for change.

All three principals were adept at securing the funding necessary to support their agendas, or they hired or found people who could do that for them. Extra funding is a necessary component of most reforms, because professional development, student materials, or special activities at schools undergoing reform are usually above and beyond what the basic school budget can afford. Principals who surround themselves with talented staff, including those who can write grants, will be much further along in achieving their goals.

Principals who have been strong leaders and agents of change are often lured away by new challenges in another context, and this has happened at two of the high schools in this study. The research team will be particularly attentive to exploring the extent to which the reforms have

been institutionalized at these schools, and how well the reforms will survive, and hopefully thrive, after the change in leadership.

**Student Identification of Program**

At this preliminary stage, it appears as if achieving gender and racial equity might be easier for Comprehensive High School, which is organized by career pathways, than it is for the high schools divided into shops or academies. At Comprehensive High School, pathways do not determine student scheduling to the same degree that shops and academies do. Pathways are manifest in students' electives, and many courses can be considered part of one or more pathways. In contrast, at the other high schools, once students have chosen their shop or academy, certain coursework is predetermined. This has an impact on efforts to achieve equity, because if a shop or academy attracts one gender over the other, educators must decide between having a gendered high school organization, or assigning students to shops or academies that were not their first or second choices.

## NEXT PHASE OF THE STUDY

One of the major advantages of longitudinal studies is the ability to follow up on emerging themes. At this point in the study, several important themes have emerged that will be included in future data collection activities.

Sustainability of secondary education reform is an ongoing question that we will continue to investigate. One of the schools in this study is located in a "high stakes" test state. The fate of the school—its very existence—depends on students' ability to pass a test. Early evidence indicates that this is having a deleterious effect on sustaining the comprehensive reforms described in this report. Teachers at this school indicated that this pressure is shifting attention away from a broad education, toward a narrow curriculum of "things that will be on the test."

Change in leadership is another important issue in the further examination of how this combination of CTE and whole-school reforms can be utilized to improve disadvantaged students' educational outcomes. In two of the high schools in the study, the administrators who have carried the reforms are retiring. We will follow how this transition affects the reforms they nurtured for a decade or more. But more than just administrators change over time. Faculty members who were influential in the successful implementation of reform retire, are transferred to other schools, or move on to other careers, and new teachers come into a school. We will examine how both formal and informal professional development works to bring new teachers into the system, or perhaps how these staff changes weaken or divert the reform efforts. Because principal- and teacher-turnover are perennial issues in secondary schools, and because the rate and scope of secondary school reforms are accelerating (U.S. Department of Education, 2001), knowledge about any successes in leadership transitions should be of particular value to the field.

In future reports, we will increase our focus on transition to and through successive levels of education. We will report on our 7th- and 9th-grade cohorts' transition successes to and through high school. We hope to say more in future years about the efficacy of the diverse mechanisms developed by schools and community colleges to facilitate the transition of students from high school to postsecondary education. The 11th-grade cohort will help us learn more about moving from high school into college and the workplace.

Finally, we will know more in future years about how these reforms function to narrow the academic achievement gap between disadvantaged and advantaged students. Final analysis of outcome data will necessarily be done in the final year, although interim analyses will be conducted. Along the way, we will be refining our current understandings of the relationships among whole-school reform, career and technical education, and desired long-term student achievement for disadvantaged students.

This is the first report from a longitudinal study of schools that were nominated for and initially observed as having success in integrating CTE and whole-school reform. Obviously, data collection is ongoing. Over the next several years, we will continue to follow the 10 longitudinal schools, gathering more school- and district-context data and outcome measures. We will begin gathering data from our control and replication sites. We will pursue the emerging

themes discussed in this report. Finally, we will analyze the multi-year contextual and outcome data and report on the effects of the integration of reform efforts on attempts to close the achievement gap between at-risk and traditional students, and on students' transitions to high school, postsecondary education, and work.

## REFERENCES

Aschbacher, P., & Rector, J. (1995). *Los Angeles Learning Centers Evaluation Report: July 1994 to June 1995*. Los Angeles: University of California, Graduate School of Education and Information Studies.

Bailey, T., & Kienzl, G. (1999, May). *What can we learn about postsecondary vocational education from existing data?* Paper presented at the NAVE Independent Advisory Panel Meeting, Washington, DC.

Balfanz, R. & Jordan (in press). *Catching up: Impact of the Talent Development High Schools ninth-grade instructional program*. Baltimore: Johns Hopkins University, Center for Research on the Education of Students Placed At Risk.

Balfanz, R., & Legters, N. E. (2001, January). *How many failing high schools are there? Where are they located? Who attends them? Why are they so bad?* Paper prepared for The Harvard Civil Rights Project and Achieve. Forum on Dropouts in America, Cambridge, MA.

Balfanz, R., & MacIver, D. (2000). Transforming high-poverty urban middle schools into strong learning institutions: Lessons from the first five years of the Talent Development Middle School. *Journal of Education for Students Placed At Risk, 5*(1) 159–182.

Bell, A. K., Charner, I., & White, R. (2001). *Curriculum integration: Does it matter who is in the driver's seat? An interim report*. Minneapolis: University of Minnesota, National Research Center for Career and Technical Education.

Boswell, K. (2001, Fall). Dual enrollment programs: Accessing the American Dream. *Update on Research and Leadership, 13*, 1–3. Champaign, IL: Office of Community College Research and Leadership.

Bottoms, G. (2001). About High Schools That Work: Message from Gene Bottoms. Retrieved September 11, 2001 from http://www.sreb.org/programs/hstw/background/bottoms message.asp

Bottoms, G., & Mikos, P. (1995). *Seven most improved High Schools That Work sites raise academic achievement in reading, mathematics, and science*. Atlanta: Southern Regional Education Board

Bottoms, G., & Presson, A. (1995). Improving high schools for career-bound youth: Reform through a multi-state network. In W. N. Grubb (Ed.), *Education through occupations in American schools, Vol. 2: The challenges of implementing curriculum integration* (pp. 35–54). New York: Teachers College Press.

Bragg, D. D. (2000, December). *How Tech Prep students transition from high school to community college*. Paper presented at the annual meeting of the American Vocational Education Research Association, San Diego, CA.

Bragg, D. D. (2001). *Promising outcomes for Tech Prep participants in eight local consortia: a summary of initial results*. Retrieved September 14, 2001, from http://www.nccte.com/publications/secure/index.asp#PromisingOutcomes

Bragg, D. D., & Layton, J. D. (1995). The role of the urban community college in educational reform. *Education and Urban Society, 27*(3), 294–312.

Bragg, D. D., Puckett, P. A., Reger IV, W. M., Thomas, H. S., & Ortman, J. (1997). *Tech Prep/School-to-Work partnerships: More trends and challenges*. (MDS-1078). Berkeley, CA: University of California, National Center for Research in Vocational Education.

Brusic, S. A., & LaPorte, J. E. (2000). The status of modular technology education in Virginia. *Journal of Industrial Teacher Education, 38*(1), 5–28.

Carl D. Perkins Vocational and Technical Education Act of 1998, Pub L. No. 105-332, § 20 U.S.C. 2301 (1998).

Carnegie Task Force on the Education of Young Adolescents. (1989, June). *Turning points: Preparing American youth for the 21st century*. New York: Carnegie Corporation.

Castellano, M., Stringfield, S. C., & Stone, J. R., III. (2001) *Career and technical education reforms and comprehensive school reforms in high schools and community colleges: Their impact on educational outcomes for at-risk youth*. Minneapolis: University of Minnesota, National Research Center on Career and Technical Education.

Cuban, L. (2001). *Oversold and underused: Computers and classrooms*. Cambridge: Harvard University Press.

Datnow, A., Hubbard, L., & Mehan, H. (2002). *Extending educational reform: From one school to many*. London: Falmer Press.

Datnow, A., & Stringfield, S. C. (2000). Working together for reliable school reform. *Journal of Education for Students Placed at Risk, 5*, 183–204.

Dewey, J. (1916). *Democracy and education*. New York: MacMillan.

Dynarski, M., & Gleason, P. (in press). Do we know whom to serve? Issues in using risk factors to identify dropouts. *Journal of Education for Students Placed at Risk, 7*(1).

Finch, C. R., & Mooney, M. (1997). *School-to-Work opportunities in the middle school: Concepts and issues*. (MDS-1096). Berkeley, CA: University of California, National Center for Research in Vocational Education.

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research, 59*, 117–142.

Guba, E., & Lincoln, Y. (1981). *Effective Evaluation.* San Francisco: Jossey Bass.

Herman, R., Aladjem, D., McMahon, P., Masem, E., Mulligan, I., O'Malley, A. S., Quinones, S., et al. (1999). *An educators' guide to school-wide reform.* Washington, DC: American Institutes for Research.

Hershey, A. M., Silverberg, M. K., Owens, T. & Hulsey, L. K. (1998). *Focus for the future: The final report of the National Tech-Prep Evaluation.* (MPR 8087-220). Princeton, NJ: Mathematica Policy Research.

Hess, F. (1999). *Spinning wheels: The politics of urban school reform.* Washington, DC: Brookings.

Hopkins, C. (1999). Proposal for a National Research Center for Career and Technical Education. University of Minnesota.

Improving America's Schools Act of 1994, Pub. L. No. 103-382 (1994).

Johnson, J., & McDonald, J. (1996). Los Angeles Learning Centers: An initiative of Los Angeles Unified School District, United Teachers of Los Angeles, and the Los Angeles Educational Partnership. In S. C. Stringfield, S. Ross, & L. Smith (Eds.), *Bold plans for school restructuring: The New American Schools designs* (pp. 261–288). Mahwah, NJ: Lawrence Erlbaum Associates.

Kaufman, P., Bradby, D., & Teitelbaum, P. (2000). *High Schools That Work and whole school reform: Raising academic achievement of vocational completers through the reform of school practice.* (MDS-1295). Berkeley, CA: University of California, National Center for Research in Vocational Education.

Kaufman, P., Kwon, J. Y., Klein, S., & Chapman, C. D. (2000). *Dropout rates in the United States: 1999.* (NCES 2001-022). Washington, DC: U.S. Department of Education.

Kemple, J. J., Poglinco, S. M., & Snipes, J. C. (1999). *Career academies: Building career awareness and work-based learning activities through employer partnerships.* New York: Manpower Demonstration Research Corporation.

Kemple, J. J., & Snipes, J. C. (2000). *Career academies: Impacts on students' engagement and performance in high school.* New York: Manpower Demonstration Research Corporation.

Krueger, R. A. (1994). *Focus groups.* Thousand Oaks, CA: Sage.

Land, D., & Legters, N. (in press). The extent and consequences of risk in U.S. education. In S. C. Stringfield & D. Land (Eds.), *Educating At-Risk Students.* Chicago: National Society for the Study of Education.

Lave, J. (1988). *Cognition in practice: Mind, mathematics, and culture in everyday life.* Cambridge, UK: Cambridge University Press.

Lee, V., Ready, D., & Johnson, D. (2001). The difficulty of identifying rare samples to study: The case of high schools divided into schools-within-schools. *Educational Evaluation and Policy Analysis, 23,* 365–379.

Lee, V. E., & Smith, J. B. (2001). *Restructuring high schools for equity and excellence: What works.* New York: Teachers College Press.

Levesque, K., Lauen, D., Teitelbaum, P., Alt, M., Librera, S., MPR Associates. (2000). *Vocational education in the United States: Toward the year 2000.* Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Little, J. W. (1993). Professional community in comprehensive high schools: The two worlds of academic and vocational teachers. In J. W. Little & M. W. McLaughlin (Eds.), *Teachers' work: Individuals, colleagues, and contexts* (pp. 137–163). New York: Teachers College Press.

Lynch, R. L. (2002) High school career and technical education for the first decade of the 21st century. *Journal of Vocational Education Research, 25* (2), 155–198.

Maxwell, N. L. (1999). *Step to college: Moving from the high school career academy through the four-year university.* (MDS-1313). Berkeley, CA: University of California, National Center for Research in Vocational Education.

Miles, M., & Huberman, M. (1994). *Qualitative data analysis* (2nd ed.). Thousand Oaks, CA: Sage.

Murphy, J., & Datnow, A. (2002). Leadership lessons from comprehensive school reform designs. In J. Murphy & A. Datnow (Eds.), *Leadership for school reform: Lessons from comprehensive school reform designs.* Thousand Oaks, CA: Corwin Press.

National Commission on Excellence in Education (1983). *A nation at risk: The imperative for educational reform.* Washington DC: Author.

Natriello, G., Pallas, A., & McDill, E. (1990). *Schooling disadvantaged children: Racing against catastrophe.* New York: Teachers College Press.

Newmann, F., & Associates (1996). *Authentic achievement: Restructuring schools for intellectual quality.* San Francisco: Jossey-Bass.

Northwest Regional Educational Laboratory (1999). *Catalog of School Reform Models.* Portland OR: Authors. Retrieved September 5, 2001, from http://www.nwrel.org/scpd/catalog/index.shtml

Nunnery, J. (1998). Reform ideology and the locus of development problem in educational restructuring: Enduring lessons from studies of educational innovations. *Education and Urban Society, 30,* 277–295.

Plank, S. (2001). *Career and technical education in the balance: An analysis of high school persistence, academic achievement, and postsecondary destinations.* Minneapolis: University of Minnesota, National Research Center for Career and Technical Education.

Resnick, L. B. (1987). Learning in school and out. *Educational Researcher, 16*(9), 13–20.

Secretary's Commission on Achieving Necessary Skills (SCANS). (1991). *What work requires of schools.* Washington DC: U.S. Department of Labor.

Stasz, C., Kaganoff, T., & Eden, R. (1998). Integrating academic and vocational education: A review of the literature, 1987-1992. In A. Milne (Ed.), *Educational reform and vocational education* (pp. 85–125). Washington, DC: U.S. Department of Education.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques.* Newbury Park, CA: Sage.

Stringfield, S. C., Millsap, M., Herman, R., Yoder, N., Brigham, N., Nesselrodt, P., et al. (1997). *Special Strategies Studies Final Report.* Washington, DC: U.S. Department of Education.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology.* Thousand Oaks, CA: Sage.

Tashakkori, A., & Teddlie, C. (Eds.) (in press). *Handbook of mixed methodologies for the behavioral, health, and social sciences.* Thousand Oaks, CA: Sage.

U.S. Census Bureau (2001). 2000 Census Information. Retrieved October 25, 2001, from http://www.census.gov/main/www/cen2000.html

U.S. Department of Education (2001). Comprehensive School Reform Demonstration Program. Retrieved October 31, 2001, from http://www.ed.gov/offices/OESE/compreform/

U.S. Department of Education, National Center for Education Statistics (2002). *Digest of Education Statistics, 2001* (NCES-2002-130). Washington DC: Author. Retrieved March 4, 2002, from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2002130

U.S. Department of Education, Office of Vocational and Adult Education (2001). Career clusters. Retrieved September 14, 2001, from http://www.ed.gov/offices/OVAE/clusters/index.html

U.S. Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations Act of 2002. Pub. L. No. 107-116, 115 Stat. 2177 (2002).

Weber, G. (1971). *Inner city children can be taught to read: Four successful schools.* (CBE Occasional Paper No. 18). Washington, DC: Council for Basic Education.

Yin, R. K. (1994). *Case study research: Design and methods* (2nd ed.). Thousand Oaks, CA: Sage.